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WENDEROTH, LIND & PONACK, L.L.P.
1030 15th Street, N.W.,
Suite 400 East
Washington, DC 20005-1503

EXAMINER	
TORRES, JOSEPH D	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/501,150	MATSUDA ET AL.	
	Examiner	Art Unit	
	Joseph D. Torres	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-40* is/are pending in the application.

4a) Of the above claim(s) *27-36,39 and 40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-26,37 and 38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 17-26, 37 and 38 in the reply filed on 02/26/2009 is acknowledged.

Claims 27-36, 39 and 40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 02/26/2009.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claims 17, 18, 22, 23, 27, 28, 32 and 33 recite, "configuring erasure position information"… "of said first byte of main data belonging to the error correction target code line to be identical to erasure position information of said second byte of main data belonging to the previous error correction code line when said judging judges that the first byte of main data and the second byte of main data were both located between the first and second bytes of sub data **before being deinterleaved**". There is no antecedent basis anywhere in the specification for such language as highlighted and underlined.

The amendment filed 05/27/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Claims 17, 18, 22, 23, 27, 28, 32 and 33 recite, "configuring erasure position information"... "of said first byte of main data belonging to the error correction target code line to be identical to erasure position information of said second byte of main data belonging to the previous error correction code line when said judging judges that the first byte of main data and the second byte of main data were both located between the first and second bytes of sub data **before being deinterleaved**". The language as highlighted and underlined is new matter.

The amendment filed 12/15/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "before being deinterleaved" on page 3.

The Applicant argues, "Furthermore, Applicants respectfully submit that the use of the phrase "before being deinterleaved" in the specification is not new matter, and that the use of this phrase in the claims satisfies the written description requirement because one of ordinary skill in the art would have understood the disclosure as originally filed to implicitly provide support for such a feature".

The Examiner asserts that the main Prior Art, Marchant, used in the current rejection of the Applicant's claim 17, for example, teaches substantially the same subject matter as the Applicant's claim 17. Figure 5 of Marchant teaches an **ECC codeword** as it is recorded on a Multitrack digital data storage system and Figure 6 of Marchant teaches the alignment of the same **ECC codeword** with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-interleaved meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant refers to the data of Figure 6 of Marchant as an **ECC codeword**, one of ordinary skill in the art would have understood that it is an unprocessed undecoded codeword. If it is not obvious and inherent that the **ECC codeword** in Marchant is not a processed by an error correction decoder, then it is not obvious that the "before being deinterleaved" is obvious form the Applicant's specification. Since the Applicant argues that it is not obvious in Marchant, the Applicant also implicitly argues that it is not possible in the Applicant's own specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 17-40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 17, 18, 22, 23, 27, 28, 32 and 33 recite, "configuring erasure position information"... "of said first byte of main data belonging to the error correction target code line to be identical to erasure position information of said second byte of main data belonging to the previous error correction code line when said judging judges that the first byte of main data and the second byte of main data were both located between the first and second bytes of sub data **before being deinterleaved**". The language as highlighted and underlined is new matter.

Claim Rejections - 35 USC § 102/103

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim

but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 17, 19, 20, 22, 24 and 25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Marchant; Alan B. (US 6631492 B2) and Kobayashi; Hisashi et al. (US 6029264 A, hereafter referred to as Kobayashi).

Figure 2 in Kobayashi is an example, i.e., a teaching reference, of the cross interleaved product code that col.4, lines 37-44 in Marchant refers to. It is used to show that in a cross interleaved product code deinterleaving cannot take place until the product encoded ECC codeword is partially decoded. That is, data entering the deinterleaver of a cross interleaved product decoder is no longer the originally cross interleaved product encoded ECC codeword, data entering the deinterleaver of a cross interleaved product decoder is intermediate partially decoded data. It is used to emphasize that which should be blatantly obvious to the Applicant, that the ECC codewords of Figures 5 and 6 in Marchant are ECC codewords of the channel in Kobayashi. Figures 5 and 6 in Marchant teach how ECC codewords stored in a storage channel line up with scratches in the storage medium on which the ECC codewords are stored. If it is inherent, then it also obvious. Col. 4, lines 8-23 in Marchant teach that scratch detection is related to channel ECC codewords for the purposes of implementing well-known burst/erasure ECC correction algorithms such as the one taught in Kobayashi. Since teachings for burst/erasure ECC correction algorithms are blatantly well-

known, Marchant does not discuss the ECC correction algorithms, but only teaches how to find burst/erasure information by aligning channel ECC codewords with scratches and relies on Prior Art such as Kobayashi for the blatantly well-known burst/erasure ECC correction algorithms. That is, the teachings of Marchant relative to Figure 2 in Kobayashi take place in the channel of Figure 2 after cross interleaved product encoding and before cross interleaved product decoding. For that reason, it is not necessary for Marchant to discus any part of the well-known cross interleaved product encoding and decoding from the prior art. It would be blatantly obvious to combine Kobayashi for the burst/erasure Error correction algorithm itself, but should not be necessary for one of ordinary skill.

Figure 2 in Kobayashi is used to teach cross interleaved ECC codewords and to emphasize that ECC codeword refers to encoded data in the communication and/or storage channel after being encoded and prior to being decoded.

35 U.S.C. 102(e) rejection of claims 17 and 22.

Marchant teaches an error correction method using a plurality of pieces of sub data which comprise error correction codes that are independent from error correction codes of an error correction target code line to configure erasure position information (col. 3, lines 30-59 in Marchant teaches using a plurality of pieces of inner/row codeword sub data which comprise error correction codes that are independent from error correction codes of an outer/column error correction target code line to configure erasure position

information; Note: col. 3 ,lines 41-57 in Marchant teaches that inner/row codeword sub data of the product code is used to configure erasure position information), said method comprising: judging whether or not a first piece of data, which is one of a plurality of pieces of data of the error correction target code line, and a second piece of data, which is one of a plurality of pieces of data of a previous error correction code line, were located between the same pieces of sub data before being deinterleaved (col. 6, lines 28-56 in Marchant teach judging whether or not a first piece of data 48b in inner/row codeword sub data row 3 of Figure 7, which is one of a plurality of pieces of data of the outer/column error correction target code line 44b, and a second piece of data 48a in inner/row codeword sub data row 3, which is one of a plurality of pieces of data of a previous error correction code line 44a, were located between the same pieces of inner/row codeword sub data rows 2 to 4 before being deinterleaving); configuring erasure position information of said first piece of data belonging to the error correction target code line to be the same as identical to erasure position information of said second piece of data belonging to the previous error correction code line when said judgment step judging judges that the first piece of data and the second piece of data are both located between the same pieces of sub data (col. 6, lines 28-56 in Marchant teach that symbols in a scratch field are configured/flagged with erasure information for a scratch so that they are configured/flagged with erasure position information for the same scratch, in particular; this process is a step for configuring/flagging erasure position information of said first piece of data 48b belonging to the outer/column error correction target code line 44b to be the same as identical row position 3 to erasure

position information of said second piece of data 48a belonging to the previous error correction code line 44a when said judgment step judging judges that the first piece of data 48b and the second piece of data 48a are both located between the same pieces of inner/row codeword sub data rows 2 to 4); and performing error correction on the error correction target code line (col. 6, lines 28-56 in Marchant).

Note: col. 6, lines 28-56 in Marchant teach that scratch detetection is performed prior to ECC. Col. 4, lines 41-60 in Marchant teach cross interleaved codes such as in U.S. Pat. No. 5,841,794 and Figure 3B teaches that de-interleaving for cross interleaved codes takes place after inner code decoding, that is, after ECC correction starts, hence; Marchant teaches an embodiment where scratch detection takes place before de-interleaving on read Cross-interleaved ECC encoded data.

As per claim 22, only data in the scratch region of Figure 7 are subjected to erasure error detection. Other ECC codewords not lying in the scratch region are ECC decoded.

As per claim 27, claim 27 recites an apparatus with the same limitations as in claim 17.

As per claim 32, claim 32 recites an apparatus with the same limitations as in claim 22.

Furthermore; col. 5, lines 40-42 and col. 4, lines 42-44 in Marchant teaches the use of ECC cross-interleaved product codes. Col. 6, lines 28-50 in Marchant teaches that scratch detection is performed and erasures are flagged before ECC processing to decode the ECC code takes place.

Figure 7B of the Kobayashi teaching reference teaches that Erasure flagging is performed in AZD unit 10 prior to decoding a ECC cross-interleaved product codes and prior to de-interleaving.

The Examiner asserts that the main Prior Art, Marchant, used in the current rejection of the Applicant's claim 17, for example, teaches substantially the same subject matter as the Applicant's claim 17. Figure 5 of Marchant teaches an ECC codeword as it is recorded on a Multitrack digital data storage system and Figure 6 of Marchant teaches the alignment of the same ECC codeword with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-interleaved meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant refers to the data of Figure 6 of Marchant as an ECC codeword, one of ordinary skill in the art would have understood that it is an unprocessed undecoded codeword.

Marchant refers to the block in Figure 5 and 6 of Marchant as an **ECC code word**, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word, but as a code word. **The fact that Marchant refers to the code word as a code word implies that it is a codeword**, i.e., cross-interleaved product encoded data, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word and not the original un-encoded data.

The Examiner asserts Marchant is intended to be incorporated into the recited prior Arts which teach cross-interleaved product encoding. Columns 5 and 6 make clear that the teachings in Figure 5-7 are for use with Prior Art codewords and that the teachings in Marchant are applied to the codewords (product encoded cross-interleaved codewords in a product encoded cross-interleaved system) at readout Prior to decode processing the codewords to extract original data.

The Examiner asserts clearly after data is de-interleaved, it is impossible or extremely difficult to determine the correction position where a scratch has occurred because the alignment of the de-interleaved data with the scratch is lost. That is why Marchant teaches that the original codeword (a product encoded cross-interleaved codeword in a product encoded cross-interleaved system) as it is stored on the storage media is correctly aligned with the scratch to determine burst/erasure information.

Erasure information by definition is positional information. Kobayashi teaches erasure correction as intended by Marchant by flagging actual data symbol positions with erasure information. Note: data symbols are defined by position

and value in a data stream. By flagging data symbol at a position in a data stream, erasure positional information is provided according to the Prior art definition of erasure. Clearly, to apply the teachings of Kobayashi to Marchant, each of the data symbols in the scratch of Figures 6 and 7 in Marchant would be flagged at the position of the erroneous symbol in the codeword. Erasure flags are erasure position information.

35 U.S.C. 102(e) rejection of claims 19 and 24.

Sub data 48a and 48b in Figure 7 of Marchant is sync data for configuring/flagging erasures.

Marchant teaches an error correction method using a plurality of pieces of sub data which comprise error correction codes that are independent from error correction codes of an error correction target code line to configure erasure position information (col. 3, lines 30-59 in Marchant teaches using a plurality of pieces of inner/row codeword sub data which comprise error correction codes that are independent from error correction codes of an outer/column error correction target code line to configure erasure position information; Note: col. 3 ,lines 41-57 in Marchant teaches that inner/row codeword sub data of the product code is used to configure erasure position information), said method comprising: judging whether or not a first piece of data, which is one of a plurality of pieces of data of the error correction target code line, and a second piece of data, which is one of a plurality of pieces of data of a previous error correction code line, were located between the same pieces of sub data before being deinterleaved (col. 6, lines

28-56 in Marchant teach judging whether or not a first piece of data 48b in inner/row codeword sub data row 3 of Figure 7, which is one of a plurality of pieces of data of the outer/column error correction target code line 44b, and a second piece of data 48a in inner/row codeword sub data row 3, which is one of a plurality of pieces of data of a previous error correction code line 44a, were located between the same pieces of inner/row codeword sub data rows 2 to 4 before being deinterleaving); configuring erasure position information of said first piece of data belonging to the error correction target code line to be the same as identical to erasure position information of said second piece of data belonging to the previous error correction code line when said judgment step judging judges that the first piece of data and the second piece of data are both located between the same pieces of sub data (col. 6, lines 28-56 in Marchant teach that symbols in a scratch field are configured/flagged with erasure information for a scratch so that they are configured/flagged with erasure position information for the same scratch, in particular; this process is a step for configuring/flagging erasure position information of said first piece of data 48b belonging to the outer/column error correction target code line 44b to be the same as identical row position 3 to erasure position information of said second piece of data 48a belonging to the previous error correction code line 44a when said judgment step judging judges that the first piece of data 48b and the second piece of data 48a are both located between the same pieces of inner/row codeword sub data rows 2 to 4); and performing error correction on the error correction target code line (col. 6, lines 28-56 in Marchant).

Note: col. 6, lines 28-56 in Marchant teach that scratch detetection is performed prior to ECC. Col. 4, lines 41-60 in Marchant teach cross interleaved codes such as in U.S. Pat. No. 5,841,794 and Figure 3B teaches that de-interleaving for cross interleaved codes takes place after inner code decoding, that is, after ECC correction starts, hence; Marchant teaches an embodiment where scratch detection takes place before de-interleaving on read Cross-interleaved ECC encoded data.

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Figure 7B of the Kobayashi teaching reference teaches that Erasure flagging is performed in AZD unit 10 prior to decoding a ECC cross-interleaved product codes and prior to de-interleaving.

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6 of Marchant teaches the alignment of the same ECC codeword with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-interleaved meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant refers to the data of Figure 6 of Marchant as an ECC codeword, one of ordinary skill in the art would have understood that it is an unprocessed undecoded codeword.

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teachings in Figure 5-7 are for use with Prior Art codewords and that the teachings in Marchant are applied to the codewords (product encoded cross-interleaved codewords in a product encoded cross-interleaved system) at readout Prior to decode processing the codewords to extract original data.

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Erasure information by definition is positional information. Kobayashi teaches erasure correction as intended by Marchant by flagging actual data symbol positions with erasure information. Note: data symbols are defined by position and value in a data stream. By flagging data symbol at a position in a data stream, erasure positional information is provided according to the Prior art definition of erasure. Clearly, to apply the teachings of Kobayashi to Marchant, each of the data symbols in the scratch of Figures 6 and 7 in Marchant would be flagged at the position of the erroneous symbol in the codeword. Erasure flags are erasure position information.

35 U.S.C. 102(e) rejection of claims 20 and 25.

If first data is outside of sub data 48a and 48b in Figured 7 of marchant.

Claims 18, 23, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marchant; Alan B. (US 6631492 B2) and Kobayashi; Hisashi et al. (US 6029264 A, hereafter referred to as Kobayashi) in view of Shutoku; Toshiyuki et al. (US 7089401 B2, hereafter referred to as Shutoku).

35 U.S.C. 103(a) rejection of claims 18 and 23.

Marchant teaches an error correction method using a plurality of pieces of sub data which comprise error correction codes that are independent from error correction codes of an error correction target code line to configure erasure position information (col. 3, lines 30-59 in Marchant teaches using a plurality of pieces of inner/row codeword sub data which comprise error correction codes that are independent from error correction codes of an outer/column error correction target code line to configure erasure position information; Note: col. 3 ,lines 41-57 in Marchant teaches that inner/row codeword sub data of the product code is used to configure erasure position information), said method comprising: judging whether or not a first piece of data, which is one of a plurality of pieces of data of the error correction target code line, and a second piece of data, which is one of a plurality of pieces of data of a previous error correction code line, were located between the same pieces of sub data before being deinterleaved (col. 6, lines 28-56 in Marchant teach judging whether or not a first piece of data 48b in inner/row codeword sub data row 3 of Figure 7, which is one of a plurality of pieces of data of the

outer/column error correction target code line 44b, and a second piece of data 48a in inner/row codeword sub data row 3, which is one of a plurality of pieces of data of a previous error correction code line 44a, were located between the same pieces of inner/row codeword sub data rows 2 to 4 before being deinterleaving); configuring erasure position information of said first piece of data belonging to the error correction target code line to be the same as identical to erasure position information of said second piece of data belonging to the previous error correction code line when said judgment step judging judges that the first piece of data and the second piece of data are both located between the same pieces of sub data (col. 6, lines 28-56 in Marchant teach that symbols in a scratch field are configured/flagged with erasure information for a scratch so that they are configured/flagged with erasure position information for the same scratch, in particular; this process is a step for configuring/flagging erasure position information of said first piece of data 48b belonging to the outer/column error correction target code line 44b to be the same as identical row position 3 to erasure position information of said second piece of data 48a belonging to the previous error correction code line 44a when said judgment step judging judges that the first piece of data 48b and the second piece of data 48a are both located between the same pieces of inner/row codeword sub data rows 2 to 4); and performing error correction on the error correction target code line (col. 6, lines 28-56 in Marchant).

Note: col. 6, lines 28-56 in Marchant teach that scratch detetection is performed prior to ECC. Col. 4, lines 41-60 in Marchant teach cross interleaved codes such as in U.S. Pat. No. 5,841,794 and Figure 3B teaches that de-interleaving for cross interleaved

codes takes place after inner code decoding, that is, after ECC correction starts, hence; Marchant teaches an embodiment where scratch detection takes place before de-interleaving on read Cross-interleaved ECC encoded data.

As per claim 23, only data in the scratch region of Figure 7 are subjected to erasure error detection. Other ECC codewords not lying in the scratch region are ECC decoded.

As per claim 28, claim 28 recites an apparatus with the same limitations as in claim 18.

As per claim 33, claim 33 recites an apparatus with the same limitations as in claim 23.

Furthermore; col. 5, lines 40-42 and col. 4, lines 42-44 in Marchant teaches the use of ECC cross-interleaved product codes. Col. 6, lines 28-50 in Marchant teaches that scratch detection is performed and erasures are flagged before ECC processing to decode the ECC code takes place.

Figure 7B of the Kobayashi teaching reference teaches that Erasure flagging is performed in AZD unit 10 prior to decoding a ECC cross-interleaved product codes and prior to de-interleaving.

The Examiner asserts that the main Prior Art, Marchant, used in the current rejection of the Applicant's claim 17, for example, teaches substantially the same subject matter as the Applicant's claim 17. Figure 5 of Marchant teaches an ECC codeword as it is recorded on a Multitrack digital data storage system and Figure 6 of Marchant teaches the alignment of the same ECC codeword with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-

interleaved meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant refers to the data of Figure 6 of Marchant as an ECC codeword, one of ordinary skill in the art would have understood that it is an unprocessed undecoded codeword.

Marchant refers to the block in Figure 5 and 6 of Marchant as an **ECC code word**, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word, but as a code word. **The fact that Marchant refers to the code word as a code word implies that it is a codeword**, i.e., cross-interleaved product encoded data, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word and not the original un-encoded data.

The Examiner asserts Marchant is intended to be incorporated into the recited prior Arts which teach cross-interleaved product encoding. Columns 5 and 6 make clear that the teachings in Figure 5-7 are for use with Prior Art codewords and that the teachings in Marchant are applied to the codewords (product encoded cross-interleaved codewords

in a product encoded cross-interleaved system) at readout Prior to decode processing the codewords to extract original data.

The Examiner asserts clearly after data is de-interleaved, it is impossible or extremely difficult to determine the correction position where a scratch has occurred because the alignment of the de-interleaved data with the scratch is lost. That is why Marchant teaches that the original codeword (a product encoded cross-interleaved codeword in a product encoded cross-interleaved system) as it is stored on the storage media is correctly aligned with the scratch to determine burst/erasure information.

Erasure information by definition is positional information. Kobayashi teaches erasure correction as intended by Marchant by flagging actual data symbol positions with erasure information. Note: data symbols are defined by position and value in a data stream. By flagging data symbol at a position in a data stream, erasure positional information is provided according to the Prior art definition of erasure. Clearly, to apply the teachings of Kobayashi to Marchant, each of the data symbols in the scratch of Figures 6 and 7 in Marchant would be flagged at the position of the erroneous symbol in the codeword. Erasure flags are erasure position information.

However Marchant does not explicitly teach the specific use of a typical DVD recording data structure as encompassed in the language “wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error

correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block".

Shutoku, in an analogous art, teaches use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between

the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block" (Figure 1-3 and col. 8, lines 52-55 in Shutoku).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marchant with the teachings of Shutoku by including use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block". This modification would have been obvious to one of ordinary skill in the art, at

the time the invention was made, because one of ordinary skill in the art would have recognized that use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block" would have provided scratch protection for DVDs.

35 U.S.C. 102(e) rejection of claims 37 and 38.

Sub data 48a and 48b in Figure 7 of Marchant is sync data for configuring/flagging erasures.

Marchant teaches an error correction method using a plurality of pieces of sub data which comprise error correction codes that are independent from error correction codes

of an error correction target code line to configure erasure position information (col. 3, lines 30-59 in Marchant teaches using a plurality of pieces of inner/row codeword sub data which comprise error correction codes that are independent from error correction codes of an outer/column error correction target code line to configure erasure position information; Note: col. 3 ,lines 41-57 in Marchant teaches that inner/row codeword sub data of the product code is used to configure erasure position information), said method comprising: judging whether or not a first piece of data, which is one of a plurality of pieces of data of the error correction target code line, and a second piece of data, which is one of a plurality of pieces of data of a previous error correction code line, were located between the same pieces of sub data before being deinterleaved (col. 6, lines 28-56 in Marchant teach judging whether or not a first piece of data 48b in inner/row codeword sub data row 3 of Figure 7, which is one of a plurality of pieces of data of the outer/column error correction target code line 44b, and a second piece of data 48a in inner/row codeword sub data row 3, which is one of a plurality of pieces of data of a previous error correction code line 44a, were located between the same pieces of inner/row codeword sub data rows 2 to 4 before being deinterleaving); configuring erasure position information of said first piece of data belonging to the error correction target code line to be the same as identical to erasure position information of said second piece of data belonging to the previous error correction code line when said judgment step judging judges that the first piece of data and the second piece of data are both located between the same pieces of sub data (col. 6, lines 28-56 in Marchant teach that symbols in a scratch field are configured/flagged with erasure information for

a scratch so that they are configured/flagged with erasure position information for the same scratch, in particular; this process is a step for configuring/flagging erasure position information of said first piece of data 48b belonging to the outer/column error correction target code line 44b to be the same as identical row position 3 to erasure position information of said second piece of data 48a belonging to the previous error correction code line 44a when said judgment step judging judges that the first piece of data 48b and the second piece of data 48a are both located between the same pieces of inner/row codeword sub data rows 2 to 4); and performing error correction on the error correction target code line (col. 6, lines 28-56 in Marchant).

Note: col. 6, lines 28-56 in Marchant teach that scratch detetection is performed prior to ECC. Col. 4, lines 41-60 in Marchant teach cross interleaved codes such as in U.S. Pat. No. 5,841,794 and Figure 3B teaches that de-interleaving for cross interleaved codes takes place after inner code decoding, that is, after ECC correction starts, hence; Marchant teaches an embodiment where scratch detection takes place before de-interleaving on read Cross-interleaved ECC encoded data.

As per claim 23, only data in the scratch region of Figure 7 are subjected to erasure error detection. Other ECC codewords not lying in the scratch region are ECC decoded.

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teaches that scratch detection is performed and erasures are flagged before ECC processing to decode the ECC code takes place.

Figure 7B of the Kobayashi teaching reference teaches that Erasure flagging is performed in AZD unit 10 prior to decoding a ECC cross-interleaved product codes and prior to de-interleaving.

The Examiner asserts that the main Prior Art, Marchant, used in the current rejection of the Applicant's claim 17, for example, teaches substantially the same subject matter as the Applicant's claim 17. Figure 5 of Marchant teaches an ECC codeword as it is recorded on a Multitrack digital data storage system and Figure 6 of Marchant teaches the alignment of the same ECC codeword with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-interleaved meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant refers to the data of Figure 6 of Marchant as an ECC codeword, one of ordinary

skill in the art would have understood that it is an unprocessed undecoded codeword.

Marchant refers to the block in Figure 5 and 6 of Marchant as an **ECC code word**, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word, but as a code word. **The fact that Marchant refers to the code word as a code word implies that it is a codeword**, i.e., cross-interleaved product encoded data, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word and not the original un-encoded data.

The Examiner asserts Marchant is intended to be incorporated into the recited prior Arts which teach cross-interleaved product encoding. Columns 5 and 6 make clear that the teachings in Figure 5-7 are for use with Prior Art codewords and that the teachings in Marchant are applied to the codewords (product encoded cross-interleaved codewords in a product encoded cross-interleaved system) at readout Prior to decode processing the codewords to extract original data.

The Examiner asserts clearly after data is de-interleaved, it is impossible or extremely difficult to determine the correction position where a scratch has occurred because the alignment of the de-interleaved data with the scratch is lost. That is why Marchant teaches that the original codeword (a product encoded cross-interleaved codeword in a product encoded cross-interleaved system) as it is stored on the storage media is correctly aligned with the scratch to determine burst/erasure information.

Erasure information by definition is positional information. Kobayashi teaches erasure correction as intended by Marchant by flagging actual data symbol positions with erasure information. Note: data symbols are defined by position and value in a data stream. By flagging data symbol at a position in a data stream, erasure positional information is provided according to the Prior art definition of erasure. Clearly, to apply the teachings of Kobayashi to Marchant, each of the data symbols in the scratch of Figures 6 and 7 in Marchant would be flagged at the position of the erroneous symbol in the codeword. Erasure flags are erasure position information.

However Marchant does not explicitly teach the specific use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second

main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block".

Shutoku, in an analogous art, teaches use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block" (Figure 1-3 and col. 8, lines 52-55 in Shutoku).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marchant with the teachings of Shutoku by including use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of

main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located; and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block". This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a typical DVD recording data structure as encompassed in the language "wherein the ECC block includes a plurality of main data areas comprising the plurality of bytes of main data of the error correction target code line and the plurality of bytes of main data of the previous error correction target code line, and a plurality of sub data areas comprising the plurality of bytes of sub data, wherein the plurality of main data areas include a first main data area and a second main data area, wherein the plurality of sub data areas include: a first sub data area in which the first byte of sub data is located; a second sub data area in which the second byte of sub data is located;

and a third sub data area in which a third byte of sub data is located, wherein the first main data area is disposed between the first sub data area and the second sub data area, wherein the second main data area is disposed between the second sub data area and the third sub data area wherein the second sub data area is disposed between the first main data area and the second main data area, and wherein said error correction target code line extends so as to be located in both of the first and second main data areas of the ECC block" would have provided scratch protection for DVDs.

1. Claims 21 and 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Marchant; Alan B. (US 6631492 B2) and Kobayashi; Hisashi et al. (US 6029264 A, hereafter referred to as Kobayashi) in view of Eachus; Joseph J. (US 3685016 A).

35 U.S.C. 103(a) rejection of claims 21 and 26.

Marchant substantially teaches the claimed invention described in claims 17-20, 22-25, 27-30 and 32-35 (as rejected above).

However Marchant does not explicitly teach the specific use of avoiding error correction when error correction capabilities are exceeded.

Eachus, in an analogous art, teaches use of avoiding error correction when error correction capabilities are exceeded (col. 13, lines 1-10 in Eachus).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marchant with the teachings of Eachus by including use of avoiding error correction when error correction capabilities are exceeded. This

modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of avoiding error correction when error correction capabilities are exceeded would have provided means for avoiding meaningless calculations (col. 13, lines 1-10 in Eachus).

Response to Arguments

Applicant's arguments filed 12/15/2008 have been fully considered but they are not persuasive.

The Applicant argues, “Furthermore, Applicants respectfully submit that the use of the phrase "before being deinterleaved" in the specification is not new matter, and that the use of this phrase in the claims satisfies the written description requirement because one of ordinary skill in the art would have understood the disclosure as originally filed to implicitly provide support for such a feature”.

The Examiner asserts that the main Prior Art, Marchant, used in the current rejection of the Applicant’s claim 17, for example, teaches substantially the same subject matter as the Applicant’s claim 17. Figure 5 of Marchant teaches an **ECC codeword** as it is recorded on a Multitrack digital data storage system and Figure 6 of Marchant teaches the alignment of the same **ECC codeword** with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-interleaved

meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant refers to the data of Figure 6 of Marchant as an **ECC codeword**, one of ordinary skill in the art would have understood that it is an unprocessed undecoded codeword. If it is not obvious and inherent that the **ECC codeword** in Marchant is not a processed by an error correction decoder, then it is not obvious that the "before being deinterleaved" is obvious form the Applicant's specification. Since the Applicant argues that it is not obvious in Marchant, the Applicant also implicitly argues that it is not possible in the Applicant's own specification.

The Examiner asserts that Marchant's Figure 5 and 6 show an ECC codeword (codeword refers to data that has been error correction encoded prior to error correction decoding). One would think that such an arrangement, which is identical to the arrangement in the Applicant's Figures 4, 7 an 8 would be sufficient support for the language "before being deinterleaved". However, the Applicant argues that it is not enough.

Applicant is required to cancel the new matter in the reply to this Office Action.

The Applicant contends, “In particular, Applicants note that the specification describes that the data in the ECC block is in an interleaved state, with main data of the ECC block that is located between the same bytes of sub data having the same erasure position information (e.g., see Fig. 4(b)), that this interleaved data is rearranged in an error correction order, and error correction is then performed utilizing the erasure position information (e.g., see Figs. 7 and 8, and the corresponding description in the specification at pages 20-24). In this regard, with respect to Figs. 7 and 8 of the present application, Applicants note that the numerical values shown in the code lines therein make it clear that data of the ECC block as shown in Fig. 4b (i.e., the data in the interleaved state, or in other words, before being deinterleaved) is deinterleaved prior to error correction being performed (e.g., see the corresponding description of Figs. 7 and 8 on pages 20-24 of the specification). Accordingly, Applicants submit that the use of the phrase "before being deinterleaved", while not expressly utilized in the original specification, has support in the original specification.”.

The Examiner asserts that Marchant’s Figure 5 and 6 show an ECC codeword (codeword refers to data that has been error correction encoded prior to error correction decoding). One would think that such an arrangement, which is identical to the arrangement in the Applicant's Figures 4, 7 an 8 would be sufficient support for the language "before being deinterleaved". However, the Applicant argues that it is not enough. **Applicant is required to cancel the new matter in the reply to this Office Action**.

The Applicant contends, "Initially, regarding the above-noted rejection, Applicants note that it is somewhat unclear how the Examiner is relying on each of the applied references in formulating the rejection. In particular, Applicants note that is not fully clear if the Examiner is taking the position that (1) the above-noted claims are being rejected as being anticipated by Marchant, or in the alternative, as being obvious over Marchant in view of Kobayashi, or (2) the above-noted claims are being rejected as being anticipated by either Marchant or Kobayashi, or in the alternative, as being obvious over Marchant or Kobayashi. Clarification is kindly requested.".

Figure 2 in Kobayashi is an example, i.e., a teaching reference, of the cross interleaved product code that col.4, lines 37-44 in Marchant refers to. It is used to show that in a cross interleaved product code deinterleaving cannot take place until the product encoded ECC codeword is partially decoded. That is, data entering the deinterleaver of a cross interleaved product decoder is no longer the originally cross interleaved product encoded ECC codeword, data entering the deinterleaver of a cross interleaved product decoder is intermediate partially decoded data. It is used to emphasize that which should be blatantly obvious to the Applicant, that the ECC codewords of Figures 5 and 6 in Marchant are ECC codewords of the channel in Kobayashi. Figures 5 and 6 in Marchant teach how ECC codewords stored in a storage channel line up with scratches in the storage medium on which the ECC codewords are stored. If it is inherent, then it also obvious. Col. 4, lines 8-23 in Marchant teach that scratch detection is related to channel ECC codewords for the purposes of implementing well-known burst/erasure

ECC correction algorithms such as the one taught in Kobayashi. Since teachings for burst/erasure ECC correction algorithms are blatantly well-known, Marchant does not discuss the ECC correction algorithms, but only teaches how to find burst/erasure information by aligning channel ECC codewords with scratches and relies on Prior Art such as Kobayashi for the blatantly well-known burst/erasure ECC correction algorithms. That is, the teachings of Marchant relative to Figure 2 in Kobayashi take place in the channel of Figure 2 after cross interleaved product encoding and before cross interleaved product decoding. For that reason, it is not necessary for Marchant to discus any part of the well-known cross interleaved product encoding and decoding from the prior art. It would be blatantly obvious to combine Kobayashi for the burst/erasure Error correction algorithm itself, but should not be necessary for one of ordinary skill.

Figure 2 in Kobayashi is used to teach cross interleaved ECC codewords and to emphasize that ECC codeword refers to encoded data in the communication and/or storage channel after being encoded and prior to being decoded.

The Applicant contends, “Regarding claim 17, Applicants note that this claim recites the features of judging whether or not a first byte of main data, which is one of a plurality of bytes of main data of the error correction target code line, and a second byte of main data, which is one of a plurality of bytes of main data of a previous error correction code line, were located between the first and second bytes of sub data before being deinterleaved; and configuring erasure position information of said first byte of main

data belonging to the error correction target code line to be identical to erasure position information of said second byte of main data belonging to the previous error correction code line when said judging judges that the first byte of main data and the second byte of main data were both located between the first and second bytes of sub data before being deinterleaved. Applicants respectfully submit that Marchant and Kobayashi, either alone or in combination, do not disclose, suggest or otherwise render obvious at least the above-noted features recited in claim 17.".

The Examiner asserts that the main Prior Art, Marchant, used in the current rejection of the Applicant's claim 17, for example, teaches substantially the same subject matter as the Applicant's claim 17. Figure 5 of Marchant teaches an **ECC codeword** as it is recorded on a Multitrack digital data storage system and Figure 6 of Marchant teaches the alignment of the same **ECC codeword** with scratches on the Multitrack digital data storage system as it is recorded on the Multitrack digital data storage system. Marchant teaches that the ECC codeword is cross-interleaved meaning that it is first encoded with an outer encoder then it is interleaved and encoded again with an inner encoder (see Figure 2 in Kobayashi). A codeword that has been processed by an ECC decoder, for example, the Inner decoder in Figure 2 in Kobayashi, Is no longer referred to as an ECC codeword, but as an inner decoded ECC codeword or a partially decoded ECC codeword. Furthermore, an inner decoded ECC codeword that is de-interelaved is no longer referred to as an ECC codeword, but as an inner decoded and de-interleaved ECC codeword or a partially decoded de-interleaved ECC codeword. Since Marchant

refers to the data of Figure 6 of Marchant as an **ECC codeword**, one of ordinary skill in the art would have understood that it is an unprocessed undecoded codeword. Figure 2 in Kobayashi is an example, i.e., a teaching reference, of the cross interleaved product code that col.4, lines 37-44 in Marchant refers to. It is used to show that in a cross interleaved product code deinterleaving cannot take place until the product encoded ECC codeword is partially decoded. That is, data entering the deinterleaver of a cross interleaved product decoder is no longer the originally cross interleaved product encoded ECC codeword, data entering the deinterleaver of a cross interleaved product decoder is intermediate partially decoded data. It is used to emphasize that which should be blatantly obvious to the Applicant, that the ECC codewords of Figures 5 and 6 in Marchant are ECC codewords of the channel in Kobayashi. Figures 5 and 6 in Marchant teach how ECC codewords stored in a storage channel line up with scratches in the storage medium on which the ECC codewords are stored. If it is inherent, then it also obvious. Col. 4, lines 8-23 in Marchant teach that scratch detection is related to channel ECC codewords for the purposes of implementing well-known burst/erasure ECC correction algorithms such as the one taught in Kobayashi. Since teachings for burst/erasure ECC correction algorithms are blatantly well-known, Marchant does not discuss the ECC correction algorithms, but only teaches how to find burst/erasure information by aligning channel ECC codewords with scratches and relies on Prior Art such as Kobayashi for the blatantly well-known burst/erasure ECC correction algorithms. **That is, the teachings of Marchant relative to Figure 2 in Kobayashi take place in the channel of Figure 2 after cross interleaved product encoding and**

before cross interleaved product decoding. For that reason, it is not necessary for Marchant to discus any part of the well-known cross interleaved product encoding and decoding from the prior art. It would be blatantly obvious to combine Kobayashi for the burst/erasure Error correction algorithm itself, but should not be necessary for one of ordinary skill.

Figure 2 in Kobayashi is used to teach cross interleaved ECC codewords and to emphasize that ECC codeword refers to encoded data in the communication and/or storage channel after being encoded and prior to being decoded.

The Applicant contends, "disclosure relates to Fig. 7 of Marchant, which depicts a block of transverse ECC code word symbols 36' recorded on a band of longitudinal data tracks 24', with scratch detection fields 44a and 44b being recorded at each end of the block (see col. 6, lines 30-32).".

That is correct. Marchant refers to the block as an **ECC code word**, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word, but as a code word. The fact that Marchant refers to the code word as a code word implies that it is a codeword, i.e., cross-interleaved product encoded data, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word and not the original un-encoded data.

The Applicant contends, "As disclosed in Marchant, scratch detection occurs when a positional coincidence is found between defective scratch detection symbols 48a and

48b in consecutive scratch detection fields, with the sections of data tracks connecting such defective scratch detection symbols 48a and 48b being flagged as suspect scratch locations (see col. 6, lines 40-44). In this regard, as explained in Marchant, all transverse ECC code word symbols 36' that are disposed on the flagged data track segments may then be processed by erasure correction (see col. 6, lines 40-44)".

That is also correct. Marchant refers to the block as an **ECC code word**, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word, but as a code word. The fact that Marchant refers to the code word as a code word implies that it is a codeword, i.e., cross-interleaved product encoded data, not as an inner decoded ECC code word, not as an inner decoded de-interleaved ECC code word and not the original un-encoded data.

The Applicant contends, "In the Office Action, the Examiner has taken the position that the scratch detection fields 48a, 48b of Fig. 7 of Marchant correspond to the bytes of main data, and has also asserted that "Marchant teaches an embodiment where scratch detection takes place before de-interleaving on read Cross-interleaved ECC encoded data" (See Office Action at page 11). Thus, the Examiner appears to be taking the position that the data shown in Fig. 7 of Marchant is cross-interleaved data. Applicants respectfully disagree".

That is incorrect. The Examiner is not taking a position. Marchant is taking a position by referring to the block as a codeword. A codeword in a cross-interleaved product code is product encoded cross-interleaved data. The Applicant is also unwittingly taking

the position that “the data shown in Fig. 7 of Marchant is cross-interleaved data” by referring to the data as a codeword.

The Applicant contends, “In the Office Action, the Examiner has taken the position that the scratch detection fields 48a, 48b of Fig. 7 of Marchant correspond to the bytes of main data, and has also asserted that "Marchant teaches an embodiment where scratch detection takes place before de-interleaving on read Cross-interleaved ECC encoded data" (See Office Action at page 11). Thus, the Examiner appears to be taking the position that the data shown in Fig. 7 of Marchant is cross-interleaved data. Applicants respectfully disagree. First, with respect to the disclosure in Marchant at col. 4, lines 41-60, which discusses cross interleaved codes, Applicants note that this disclosure is not directed to Fig. 7, but instead, is directed to Fig. 4 of Marchant, which is a "prior art" figure. Second, with respect to the disclosure at col. 5, lines 40-42 of Marchant, which indicates that "the band of data tracks on which a transverse ECC code word is recorded may interleaved in the cross track direction with one or more other bands of data tracks", Applicants note that this description is also not directed to Fig. 7 of Marchant, but instead, is directed to Fig. 5. In this regard, while Figs. 4 and 5 of Marchant utilize data that is interleaved in the cross-track direction, Applicants respectfully submit that in Fig. 7, the defective scratch detection symbols 48a and 48b, as well as the ECC code word symbols 36', are not interleaved. If the Examiner disagrees, and believes that the data in Fig. 7 of Marchant is interleaved, Applicants kindly request that the Examiner provide support for such a position.”.

The Examiner asserts Marchant is intended to be incorporated into the recited prior Arts which teach cross-interleaved product encoding. Columns 5 and 6 make clear that the teachings in Figure 5-7 are for use with Prior Art codewords and that the teachings in Marchant are applied to the codewords (product encoded cross-interleaved codewords in a product encoded cross-interleaved system) at readout Prior to decode processing the codewords to extract original data.

The Applicant contends, "In particular, Applicants note that if cross-interleaved data was utilized in Fig. 7, that it would be impossible to determine the correct position where a scratch has occurred. The reason for this is as follows. As is evident from Fig. 7 of Marchant, when performing error correction, in order to determine the correction position where a scratch has occurred, it would be necessary to perform error correction on areas of the same track. Thus, if the data shown in Fig. 7 of Marchant was interleaved in a cross-track direction, Applicants note that it would simply not be possible to determine the correct location of the scratch because the error correction would not be able to be performed on areas of the same track".

The Appliants' argument is absurd. After data is de-interleaved, it is impossible or extremely difficult to determine the correction position where a scratch has occurred because the alignment of the de-interleaved data with the scratch is lost. Only the original codeword (a product encoded cross-interleaved codeword in a product encoded cross-interleaved system) as it is stored on the storage media is correctly aligned with the scratch.

The Applicant contends, “Moreover, to the extent that the Examiner is taking the position that the erasure flags of Kobayashi correspond to the "erasure position information" as recited in claim 17, Applicants respectfully disagree. In particular, Applicants note that the erasure flags of Kobayashi are merely utilized to identify data to which error correction is to be performed, whereas the "erasure position information" recited in claim 17 is described as being configured to be identical for first and second bytes of main data when said judging judges that the first byte of main data and the second byte of main data were both located between the first and second bytes of sub data before being deinterleaved. In other words, Applicants note that because the erasure flags of Kobayashi will clearly not be "configured" as set forth above in claim 17 (i.e., claim 17 recites the feature of configuring erasure position information of said first byte of main data belonging to the error correction target code line to be identical to erasure position information of said second byte of main data belonging to the previous error correction code line when said judging judges that the first byte of main data and the second byte of main data were both located between the first and second bytes of sub data before being deinterleaved), Applicants respectfully submit that the erasure flags of Kobayashi do not correspond to the erasure position information as described in claim 17.”.

This argument is also absurd. Erasure information by definition is positional information. There is nothing in Kobayashi and Marchant to indicate that either Kobayashi or Marchant stray from that definition. Kobayashi teaches erasure correction

as intended by Marchant by flagging actual data symbol positions with erasure information. Note: data symbols are defined by position and value in a data stream. By flagging data symbol at a position in a data stream, erasure positional information is provided according to the Prior art definition of erasure. Clearly, to apply the teachings of Kobayashi to Marchant, each of the data symbols in the scratch of Figures 6 and 7 in Marchant would be flagged at the position of the erroneous symbol in the codeword. Erasure flags are erasure position information.

The Applicant contends, "For at least similar reasons as discussed above with respect to claim 17, Applicants respectfully submit that the above-noted features recited in claim 19 are not disclosed, suggested or otherwise rendered obvious by the cited prior art. Accordingly, Applicants submit that claim 19 is patentable over the cited prior art, an indication of which is kindly requested. Claim 20 depends from claim 19 and is therefore considered patentable at least by virtue of its dependency.".
The Examiner disagrees and asserts that claim 19 cannot be patentable over the cited prior art "for at least similar reasons as discussed above with respect to claim 17" since as the Examiner has shown, claim 17 is not patentable over the Prior Art.

The Applicant contends, "For at least similar reasons as discussed above with respect to claim 17, Applicants respectfully submit that the above-noted features recited in claims 22 and 24 are not disclosed, suggested or otherwise rendered obvious by the

cited prior art. Accordingly, Applicants submit that claims 22 and 24 are patentable over the cited prior art, an indication of which is kindly requested".

The Examiner disagrees and asserts that claims 22 and 24 cannot be patentable over the cited prior art "for at least similar reasons as discussed above with respect to claim 17" since as the Examiner has shown, claim 17 is not patentable over the Prior Art.

The Applicant contends, "For at least similar reasons as discussed above with respect to claim 17, Applicants respectfully submit that the above-noted features recited in claims 18 and 37 are not disclosed, suggested or otherwise rendered obvious by the cited prior art. Accordingly, Applicants submit that claims 22 and 24 are patentable over the cited prior art, an indication of which is kindly requested".

The Examiner disagrees and asserts that claim 18 cannot be patentable over the cited prior art "for at least similar reasons as discussed above with respect to claim 17" since as the Examiner has shown, claim 17 is not patentable over the Prior Art.

The Applicant contends, "For at least similar reasons as discussed above with respect to claim 17, Applicants respectfully submit that the above-noted features recited in claims 23 and 38 are not disclosed, suggested or otherwise rendered obvious by the cited prior art. Accordingly, Applicants submit that claims 22 and 24 are patentable over the cited prior art, an indication of which is kindly requested".

The Examiner disagrees and asserts that claim 23 cannot be patentable over the cited prior art "for at least similar reasons as discussed above with respect to claim 17" since as the Examiner has shown, claim 17 is not patentable over the Prior Art.

The Applicant contends, "For at least similar reasons as discussed above with respect to claim 17, Applicants respectfully submit that the above-noted features recited in claim 37 are not disclosed, suggested or otherwise rendered obvious by the cited prior art. Accordingly, Applicants submit that claims 22 and 24 are patentable over the cited prior art, an indication of which is kindly requested".

The Examiner disagrees and asserts that claim 37 cannot be patentable over the cited prior art "for at least similar reasons as discussed above with respect to claim 17" since as the Examiner has shown, claim 17 is not patentable over the Prior Art.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott T. Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joseph D Torres
Primary Examiner
Art Unit 2112

/Joseph D Torres/
Primary Examiner, Art Unit 2112